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DEVELOPMENT OF THE CZECHOSLOVAK POWER INDUSTRY

[This report is an exploitation of two articles in Za Socialistickou vedu a techniku (For Socialist Science and Technology), Vol III, No 9, September 1953, dealing with the electric power situation in Czechoslovakia. The articles present information on background, planning, and methods used in the Czechoslovak power industry, and project some data through 1960.]

General Plan for Development of the Czechoslovak Power Industry

The planned development of the Czechoslovak economy requires the adoption of certain measures to ensure the proportional growth of all components of the economy, to prevent their irregular development and expansion, and thus prevent the occurrence of crises. Hence, short-term plans are impractical and have to be replaced by long-term planning. Depending on the particular sector of the economy, such long-term plans may well be projected over a period of 10-15 years. A disadvantage of such planning is the difficulty encountered in balancing all the components of production. This difficulty arises primarily because of a failure to understand the development of methods and technology to an adequate degree. Therefore, operations must be conducted over shorter periods of time to achieve a partial balancing. Under conditions prevailing in Czechoslovakia, it was felt that 1960 would be the best short-term balancing period.

Before the work of balancing began, all existing shortcomings and disproportions had to be eliminated, not only in the electric power industry, but in the entire power management concept throughout all industries, as well as in fuel supply operations.

The above step had to be taken for the following reasons:

1. During the Nazi occupation, geological research was badly neglected and little attention was paid to safeguarding the basic power resources of Czechoslovakia.
2. The reconstruction of industrial power plants was neglected during the Two-Year and Five-Year Plans. During this period, industrial establishments expanded at will to meet domestic and foreign orders and eventually caused serious power shortages, since their power consumption rose significantly.
3. Introduction of new methods of drawing up the state plan in 1952 did not permit a sufficiently rapid elimination of old planning methods. One of the greatest shortcomings of this period was the absence of any long-term developmental plan for the Czechoslovak economy as a whole, a situation which gave rise to the fear that still further disproportions would occur. Many enterprises could not implement their newly assigned tasks with sufficient flexibility and reverted to their former poor practices.
4. The electric power industry continued to operate in an inefficient manner. For example, hundreds of small power plants and boiler plants were geared to the use of high grade fuels at a low efficiency rate. Insufficient attention was devoted to the practice of combination power production (production of power by thermoelectric methods, making steam and heat available at the same time), despite the fact that it was recognized that Czechoslovakia did not have abundant natural resources. This situation continued until well after 1945.

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To determine the nature of the basic disproportions in the power-producing industry, an analysis of the power economy was ordered during 1951 and 1952, based on power balances suggested by Soviet experiences. Although many of the shortcomings in the Czechoslovak power industry had been recognized, the results of this analysis were surprising. It was determined that some 13 percent of the current solid-fuel requirements of the power industry could be saved by using the latest Soviet methods. This was felt to be the best way of avoiding additional disproportions in the solid-fuel supply in Czechoslovakia, and effective fuel conservation was considered essential for implementation of the new program.

Fuel was to be conserved as follows:

1. In the extraction and dressing phase of solid fuels.
2. In changing from one type of fuel to another (for example, obtaining gas during coking operations).
3. In changing fuels into heat (for example, by using boilers).
4. In changing heat into electric power or mechanical force.
5. In the hydrogenation of fuels.
6. By centralizing and combining the supply of available power.
7. By effective decentralization of new industrial enterprises.
8. By regulating the consumption of various forms of power.
9. In the distribution phase of various forms of power.
10. In railroad transportation (particularly by the use of electric power on railroads).
11. By using waste power from secondary power sources.
12. By mutual aid from friendly nations in supplying power to Czechoslovakia.

To complete such a plan satisfactorily, standards for power consumption, never before used in Czechoslovakia, had to be prepared. This was a very complex process; it was divided into two sections. The first section involved the establishment of consumption standards, which had to be checked after a certain time and adjusted. This phase ended in August 1953, when the results were presented to a conference of power technicians in Liberec. At this time, a decision was reached to use two approaches to the entire problem. First, the consumption of power had to be measured in various ways, and, second, a steady supply of raw materials for the production of power had to be ensured. The later phase involved the following four specific tasks:

1. Insurance [and provision by planning?] of an adequate raw-material base (fuels, water, waste power from secondary sources, etc.).
2. Establishment of a method of production (hydroelectric power plants, condensation power plants, gasworks, reconstruction and expansion of existing power facilities, etc.).
3. Planning of the location of facilities.
4. Calculation of costs of facilities and their operation

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To implement this plan successfully, consumption of power had to be analyzed for purposes of calculation and classification. Power-producing facilities were first classified by kraj and later, in the final stages, by a smaller unit referred to as a "mikro-oblast." This unit, an area 8 kilometers square, was used to determine the allocation of power-producing facilities as well as the amount of power to be consumed, particularly steam and heat.

Such an ambitious plan, and the calculations ensuing from it, required the establishment of the following twelve working commissions:

1. Commission for Fuel Balance.
2. Commission for the Gas Industry.
3. Commission for Consumption of Electric Power and Decentralization of Power Consumption.
4. Commission for Standardization of Power Consumption.
5. Thermal Commission.
6. Commission for Hydroelectric Power Plants.
7. Commission for Reconstruction and Expansion of Existing Electric Power Plants.
8. Commission for Development of Condensation Electric Power Plants.
9. Commission for Transfer and Distribution of Electric Power.
10. Standardization Commission.
11. Budgetary Commission.
12. Coordinating Commission.

Each commission was given specific assignments and was to recommend action designed to improve the power supply situation once the plan was drawn up.

For example, the Commission for Consumption of Electric Power and Decentralization of Power Consumption undertook a detailed study of the potential increase in home consumption of electric power and foresaw an increase in consumption in the average home to a total of 144 kilowatt-hours [per year?] by 1960. Consumption in rural areas was expected to rise significantly higher than that of urban areas, since an increasing changeover to the use of gas is planned for cities. The commission based its recommendations on available data on current and projected (through 1960) consumption of electric power for the following purposes:

<u>Type of Consumption</u>	<u>No and Type of Power-Consuming Units</u>
Lighting	200 households
Cooking (small-scale)	1,000 stoves
Ironing	2,450 irons
Vacuum cleaners	100 units
Washers	400 (not counting communal laundries)
Radio and television	600 sets (not counting wired radio)

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<u>Type of Consumption</u>	<u>No and Type of Power-Consuming Units</u>
Refrigerators	100 units
Other motor-driven appliances	50 units
Household cooking (normal)	320 households
Hot-water heaters	49 units

Because of a shortage of available data, the commission did not plan the use of electric power for agricultural irrigation, or its use by power tractors.

The Commission for Standardization of Power Consumption, on the other hand, was more concerned with over-all consumption requirements, from the point of view of regulating them and establishing norms for consumption. Preliminary data available to the commission indicated that consumption of power from various sources will show the following increases by 1960 (in percent of 1952):

Solid fuels	62
Inflammable gases	85
Heat (Steam, hot water)	55
Electricity	119

In evaluating the over-all consumption of power in Czechoslovakia, the commission found that the consumption of electric power in the metallurgical industry alone will increase by 1960 some 29.5 percent over consumption in 1952. The actual proportion of the production of steel to the production of electric power, however, will remain somewhat the same as that found in the USSR. -- Engr Zdenek Pavlicek, Ministry of Fuel and Power, Prague

The Task of Water Power in the Czechoslovak Power Economy

In February 1951, the Communist Party of Czechoslovakia agreed that water power should have an increasing share in Czechoslovak power production. The party decreed that between 1950 and 1955, water power was to increase its share of the total power produced in Czechoslovakia from 10 percent to 15 percent. This means that between 1951 and 1955, the newly built hydroelectric power facilities would have to supply twice the combined volume of electric power heretofore produced by all hydroelectric power plants built in Czechoslovakia during the last 50 years.

The best potential sources of water power in Czechoslovakia are the Vltava, the Lower Labe, the Danube, the Vah, the Hron, and the Hornad rivers, which could provide some 75 percent of the usable water power in the country.

Water power is considered the most suitable source of electric power, since hydroelectric power plants are efficient, the source of power is more or less constant and plentiful, power produced by a hydroelectric power plant is much cheaper than that produced by other means, and correctly designed hydroelectric power projects also aid agricultural irrigation and regulate navigable stretches of waterways.

Since Czechoslovakia is unable to develop her potential water power at a speed sufficient to keep pace with the ever increasing demand for power because of large-scale industrialization and electrification, the construction of thermal electric power plants will continue to be the basic assignment of the Czechoslovak power industry, despite the fact that such plants are less efficient, more expensive, and more complex to operate than hydroelectric power plants.

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Using Soviet methods of accounting, the investment in a hydroelectric power project should be amortized in 15-25 years, depending on the potential output of the plant. If Czechoslovakia were to complete about 75 percent of her potential power project construction in the next 25 years, at the rate of construction provided for in the original 1948 long-term plan, some 100 million tons of coal could be saved by substituting water power for thermal power in producing the same quantity of electricity. If Czechoslovakia were able not only to complete now the hydroelectric power plants currently under construction, but also to build five new ones of sufficient capacity by 1960, saving in coal could amount to 200 million tons in the 25 years. The above data lead to the conclusion that if all potential water power were correctly and efficiently used, Czechoslovakia could save about 10 years' output of coal, at the present rate of production. This saving would release about 100,000 workers for other industries, and some 5 million cubic meters of pit props would be saved.

Although hydroelectric power plants are potentially capable of effecting substantial savings in coal, manpower, money, and lumber, their original construction is rather costly.

The USSR currently produces some 25 percent of all its electric power from water (resources and plans to increase this ratio to one third in the near future. Czechoslovak water resources, however, are not comparable to those of the USSR and could account for only a much smaller percentage of the total power production. If Czechoslovakia could successfully build at least part of her planned hydroelectric projects on the Vltava and Danube rivers and in the principal reaches of the Vah River in Slovakia, then, by 1960, water power could account for 16-20 percent of all electric power produced in Czechoslovakia. This would mean an over-all rise of 5 to 6 times the 1950 production of hydroelectric power.

Despite the fact that utilization of all potential water power in Czechoslovakia would not be sufficient to keep pace with industry's ever increasing demand for power, the economy would benefit greatly from increased use of water power. Ways and means should therefore be found to speed the construction of all planned water power projects so that the entire water power potential of the country could be utilized as soon as possible. -- Jaroslav Michalec, State Planning Office, Prague

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